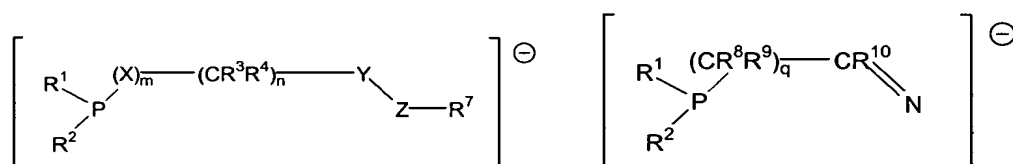
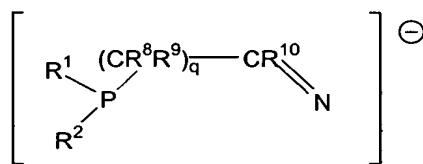


# Listing of Claims

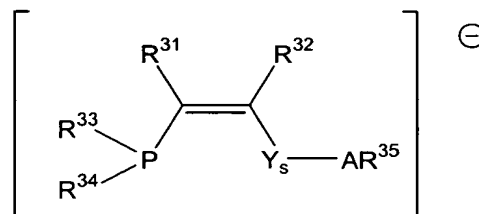
BI 1. (original) A process for the polymerization of olefins, comprising the step of contacting, at a temperature of about -100°C to about +200°C, at least one polymerizable olefin with an active polymerization catalyst comprising a Group 3 through 11 (IUPAC) transition metal or a lanthanide metal complex of a ligand of the formula (I), (II) or (XII)



(I)



(II)



(XII)

wherein:

$R^1$  and  $R^2$  are each independently hydrocarbyl, substituted hydrocarbyl or a functional group;

Y is  $CR^{11}R^{12}$ , S(T), S(T)<sub>2</sub>, P(T)Q,  $NR^{36}$  or  $NR^{36}NR^{36}$ ;

X is O,  $CR^5R^6$  or  $NR^5$ ;

A is O, S, Se, N, P or As;

Z is O, Se, N, P or As;

each Q is independently hydrocarbyl or substituted hydrocarbyl;

$R^3$ ,  $R^4$ ,  $R^5$ ,  $R^6$ ,  $R^{11}$  and  $R^{12}$  are each independently hydrogen, hydrocarbyl, substituted hydrocarbyl or a functional group;

$R^7$  is hydrogen, hydrocarbyl, substituted hydrocarbyl or a functional group, provided that when Z is O or Se,  $R^7$  is not present;

$R^8$  and  $R^9$  are each independently hydrogen, hydrocarbyl, substituted hydrocarbyl or a functional group;

*β*  
R<sup>10</sup> is hydrogen, hydrocarbyl, substituted hydrocarbyl or a functional group;  
each T is independently =O or =NR<sup>30</sup>;

R<sup>30</sup> is hydrogen, hydrocarbyl, substituted hydrocarbyl or a functional group;

R<sup>31</sup> and R<sup>32</sup> are each independently hydrogen, hydrocarbyl, substituted hydrocarbyl or a functional group;

R<sup>33</sup> and R<sup>34</sup> are each independently hydrocarbyl or substituted hydrocarbyl, provided that each is independently an aryl substituted in at least one position vicinal to the free bond of the aryl group, or each independently has an E<sub>s</sub> of -1.0 or less;

R<sup>35</sup> is hydrogen, hydrocarbyl, substituted hydrocarbyl or a functional group, provided that when A is O, S or Se, R<sup>35</sup> is not present;

each R<sup>36</sup> is independently hydrogen, hydrocarbyl, substituted hydrocarbyl or a functional group;

m is 0 or 1;

s is 0 or 1;

n is 0 or 1; and

q is 0 or 1;

and provided that:

any two of R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>8</sup>, R<sup>9</sup>, R<sup>11</sup> and R<sup>12</sup> bonded to the same carbon atom taken together may form a functional group;

any two of R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>9</sup>, R<sup>11</sup>, R<sup>12</sup>, R<sup>31</sup>, R<sup>32</sup>, R<sup>33</sup>, R<sup>34</sup>, R<sup>35</sup> and R<sup>36</sup> bonded to the same atom or vicinal to one another taken together may form a ring; and

when said ligand is (I), Y is C(O), Z is O, and R<sup>1</sup> and R<sup>2</sup> are each independently hydrocarbyl, then R<sup>1</sup> and R<sup>2</sup> are each independently an aryl substituted in one position vicinal to the free bond of the aryl group, or R<sup>1</sup> and R<sup>2</sup> each independently have an E<sub>s</sub> of -1.0 or less.

2. (original) The process of claim 1, wherein said transition metal is Ni, Pd, Pt, Fe, Co, Ti, Zr, V, Hf, Cr or Cu.

3. (original) The process of claim 2, wherein said transition metal is Ni, Pd, Ti or Zr.

4. (original) The process of claim 1, wherein the ligand is (I) and:

the transition metal is Ni, m is 0, n is 1,  $R^3$  and  $R^4$  are hydrogen, Y is  $CR^{11}R^{12}$ ,  $R^{11}$  is hydrocarbyl or substituted hydrocarbyl,  $R^{12}$  is hydrocarbyl, substituted hydrocarbyl or a functional group, and Z is O; or

the transition metal is Ti, m is 0, n is 1,  $R^3$  and  $R^4$  are hydrogen, Y is  $CR^{11}R^{12}$ ,  $R^{11}$  is hydrocarbyl or substituted hydrocarbyl,  $R^{12}$  is hydrocarbyl, substituted hydrocarbyl or a functional group, and Z is O; or

the transition metal is Zr, m is 0, n is 1,  $R^3$  and  $R^4$  are hydrogen, Y is  $CR^{11}R^{12}$ ,  $R^{11}$  is hydrocarbyl or substituted hydrocarbyl,  $R^{12}$  is hydrocarbyl, substituted hydrocarbyl or a functional group, and Z is O; or

the transition metal is Ni, m is 0, n is 1,  $R^3$  and  $R^4$  are hydrogen,  $R^7$  is hydrocarbyl or substituted hydrocarbyl, Y is  $CR^{11}R^{12}$ ,  $R^{11}$  is hydrogen,  $R^{12}$  is hydrocarbyl or substituted hydrocarbyl, and Z is N; or

the transition metal is Ni, m is 0, n is 1,  $R^3$  and  $R^4$  are hydrogen, Y is  $CR^{11}R^{12}$ ,  $R^{11}$  and  $R^{12}$  taken together are oxo, and Z is O; or

the transition metal is Ni, m is 0, n is 1,  $R^3$  and  $R^4$  are hydrogen,  $R^7$  is hydrocarbyl or substituted hydrocarbyl, Y is  $CR^{11}R^{12}$ ,  $R^{11}$  and  $R^{12}$  taken together are oxo, and Z is N; or

the transition metal is Ni, m is 0, n is 1,  $R^3$  and  $R^4$  are hydrogen, Y is S(T), T is =O and Z is O; or

the transition metal is Ni, m is 0, n is 1,  $R^3$  and  $R^4$  are hydrogen, Y is S(T), T is =N-silyl, Z is N and  $R^7$  is silyl; or

the transition metal is Ni, m is 0, n is 1,  $R^3$  and  $R^4$  are hydrogen, Y is S(T), T is =O, Z is N, and  $R^7$  is hydrocarbyl or substituted hydrocarbyl; or

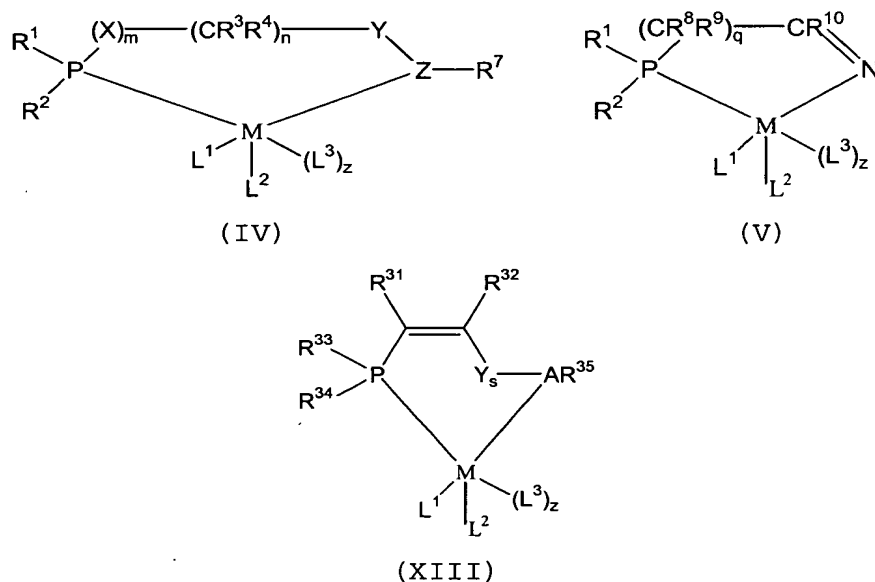
the transition metal is Ni, m is 0, n is 1,  $R^3$  and  $R^4$  are hydrogen, Y is  $CR^{11}R^{12}$ ,  $R^{11}$  and  $R^{12}$  taken together are a ring and Z is O; or

the transition metal is Ni, m is 0, n is 1,  $R^3$  and  $R^4$  are hydrogen, Y is  $CR^{11}R^{12}$ ,  $R^{11}$  and  $R^{12}$  taken together are N-hydrocarbyl- or N-substituted hydrocarbylimino, Z is N and  $R^7$  is hydrocarbyl or substituted hydrocarbyl; or

the transition metal is Ni, m is 0, n is 1,  $R^3$  and  $R^4$  are hydrogen, Y is S(T), T is =O and Z is O; or

the transition metal is Ni, m is 0, n is 1,  $R^3$  and  $R^4$  are hydrogen, Y is  $CR^{11}R^{12}$ ,  $R^{11}$  and  $R^{12}$  taken together are sulfo, Z is N and  $R^7$  is hydrocarbyl or substituted hydrocarbyl.

5. (original) A process for the polymerization of olefins, comprising the step of contacting, at a temperature of about  $-100^{\circ}C$  to about  $+200^{\circ}C$ , at least one polymerizable olefin with a compound of the formula (IV), (V) or (XIII)



wherein:

$R^1$  and  $R^2$  are each independently hydrocarbyl, substituted hydrocarbyl or a functional group;

Y is  $CR^{11}R^{12}$ , S(T), S(T)<sub>2</sub>, P(T)Q,  $NR^{36}$  or  $NR^{36}NR^{36}$ ;

X is O,  $CR^5R^6$  or  $NR^5$ ;

A is O, S, Se, N, P or As;

Z is O, Se, N, P or As;

each Q is independently hydrocarbyl or substituted hydrocarbyl;

$R^3$ ,  $R^4$ ,  $R^5$ ,  $R^6$ ,  $R^{11}$  and  $R^{12}$  are each independently hydrogen, hydrocarbyl, substituted hydrocarbyl or a functional group;

$R^7$  is hydrogen, hydrocarbyl, substituted hydrocarbyl or a functional group, provided that when Z is O or Se,  $R^7$  is not present;

*61*  
R<sup>8</sup> and R<sup>9</sup> are each independently hydrogen, hydrocarbyl, substituted hydrocarbyl or a functional group;

R<sup>10</sup> is hydrogen, hydrocarbyl, substituted hydrocarbyl or a functional group;  
each T is independently =O or =NR<sup>30</sup>;

R<sup>30</sup> is hydrogen, hydrocarbyl, substituted hydrocarbyl or a functional group;  
R<sup>31</sup> and R<sup>32</sup> are each independently hydrogen, hydrocarbyl, substituted hydrocarbyl or a functional group;

R<sup>33</sup> and R<sup>34</sup> are each independently hydrocarbyl or substituted hydrocarbyl, provided that each is independently an aryl substituted in at least one position vicinal to the free bond of the aryl group, or each independently has an E<sub>s</sub> of -1.0 or less;

R<sup>35</sup> is hydrogen, hydrocarbyl, substituted hydrocarbyl or a functional group, provided that when A is O, S or Se, R<sup>35</sup> is not present;

each R<sup>36</sup> is independently hydrogen, hydrocarbyl, substituted hydrocarbyl or a functional group;

m is 0 or 1;

s is 0 or 1;

n is 0 or 1; and

q is 0 or 1;

M is a Group 3 through Group 11 transition metal or a lanthanide metal; and

L<sup>1</sup> is a monodentate monoanionic ligand into which an ethylene molecule may insert between L<sup>1</sup> and M, and L<sup>2</sup> is a monodentate neutral ligand which may be displaced by ethylene or an empty coordination site, or L<sup>1</sup> and L<sup>2</sup> taken together are a monoanionic bidentate ligand into which ethylene may insert between said monoanionic bidentate ligand and said nickel atom, and each L<sup>3</sup> is independently a monoanionic ligand and z is the oxidation state of M minus 2;  
and provided that;

any two of R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>8</sup>, R<sup>9</sup>, R<sup>11</sup> and R<sup>12</sup> bonded to the same carbon atom taken together may form a functional group;

any two of R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup>, R<sup>4</sup>, R<sup>5</sup>, R<sup>6</sup>, R<sup>7</sup>, R<sup>8</sup>, R<sup>9</sup>, R<sup>11</sup>, R<sup>12</sup>, R<sup>31</sup>, R<sup>32</sup>, R<sup>33</sup>, R<sup>34</sup>, R<sup>35</sup> and R<sup>36</sup> bonded to the same atom or vicinal to one another taken together may form a ring; and

when said compound is (IV), Y is C(O), Z is O, and R<sup>1</sup> and R<sup>2</sup> are each independently hydrocarbyl, then R<sup>1</sup> and R<sup>2</sup> are each independently an aryl substituted in one position vicinal to the free bond of the aryl group, or R<sup>1</sup> and R<sup>2</sup> each independently have an E<sub>s</sub> of -1.0 or less.

6. (original) The process of claim 5, wherein M is Ni, Pd, Pt, Fe, Co, Ti, Zr, V, Hf, Cr or Cu.

7. (original) The process of claim 6, wherein M is Ni, Pd, Ti or Zr.

8. (original) The process of claim 5, wherein the compound is (IV) and:

M is Ni, m is 0, n is 1, R<sup>3</sup> and R<sup>4</sup> are hydrogen, Y is CR<sup>11</sup>R<sup>12</sup>, R<sup>11</sup> is hydrocarbyl or substituted hydrocarbyl, R<sup>12</sup> is hydrocarbyl, substituted hydrocarbyl or a functional group, and Z is O; or

M is Ti, m is 0, n is 1, R<sup>3</sup> and R<sup>4</sup> are hydrogen, Y is CR<sup>11</sup>R<sup>12</sup>, R<sup>11</sup> is hydrocarbyl or substituted hydrocarbyl, R<sup>12</sup> is hydrocarbyl, substituted hydrocarbyl or a functional group, and Z is O; or

M is Zr, m is 0, n is 1, R<sup>3</sup> and R<sup>4</sup> are hydrogen, Y is CR<sup>11</sup>R<sup>12</sup>, R<sup>11</sup> is hydrocarbyl or substituted hydrocarbyl, R<sup>12</sup> is hydrocarbyl, substituted hydrocarbyl or a functional group, and Z is O; or

M is Ni, m is 0, n is 1, R<sup>3</sup> and R<sup>4</sup> are hydrogen, R<sup>7</sup> is hydrocarbyl or substituted hydrocarbyl, Y is CR<sup>11</sup>R<sup>12</sup>, R<sup>11</sup> is hydrogen, R<sup>12</sup> is hydrocarbyl or substituted hydrocarbyl, and Z is N; or

M is Ni, m is 0, n is 1, R<sup>3</sup> and R<sup>4</sup> are hydrogen, Y is CR<sup>11</sup>R<sup>12</sup>, R<sup>11</sup> and R<sup>12</sup> taken together are oxo, and Z is O; or

M is Ni, m is 0, n is 1, R<sup>3</sup> and R<sup>4</sup> are hydrogen, R<sup>7</sup> is hydrocarbyl or substituted hydrocarbyl, Y is CR<sup>11</sup>R<sup>12</sup>, R<sup>11</sup> and R<sup>12</sup> taken together are oxo, and Z is N; or

M is Ni, m is 0, n is 1, R<sup>3</sup> and R<sup>4</sup> are hydrogen, Y is S(T), T is =O and Z is O; or

M is Ni, m is 0, n is 1, R<sup>3</sup> and R<sup>4</sup> are hydrogen, Y is S(T), T is =N-silyl, Z is N and R<sup>7</sup> is silyl; or

B1 M is Ni, m is 0, n is 1, R<sup>3</sup> and R<sup>4</sup> are hydrogen, Y is S(T), T is =O, Z is N, and R<sup>7</sup> is hydrocarbyl or substituted hydrocarbyl; or

M is Ni, m is 0, n is 1, R<sup>3</sup> and R<sup>4</sup> are hydrogen, Y is CR<sup>11</sup>R<sup>12</sup>, R<sup>11</sup> and R<sup>12</sup> taken together are a ring and Z is O; or

M is Ni, m is 0, n is 1, R<sup>3</sup> and R<sup>4</sup> are hydrogen, Y is CR<sup>11</sup>R<sup>12</sup>, R<sup>11</sup> and R<sup>12</sup> taken together are N-hydrocarbyl- or N-substituted hydrocarbylimino, Z is N and R<sup>7</sup> is hydrocarbyl or substituted hydrocarbyl; or

M is Ni, m is 0, n is 1, R<sup>3</sup> and R<sup>4</sup> are hydrogen, Y is S(T), T is =O and Z is O;  
or

the transition metal is Ni, m is 0, n is 1, R<sup>3</sup> and R<sup>4</sup> are hydrogen, Y is CR<sup>11</sup>R<sup>12</sup>, R<sup>11</sup> and R<sup>12</sup> taken together are sulfo, Z is N and R<sup>7</sup> is hydrocarbyl or substituted hydrocarbyl.

Claims 9-11 (canceled).

Claims 12-15 (withdrawn from consideration).

Claims 16-18 (canceled).